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GENERAL ARTICLES

INTESTINAL TUBERCULOSIS: SOME OBSERVATIONS

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INTESTINAL tuberculosis of the secondary ulcerative type has long been recognised as a frequent and serious complication of pulmonary tuberculosis in its terminal stages, with the result that the considerable volume of literature on the subject has been concerned more with pathological and statistical data than with clinical study from the therapeutic aspect. In the British journals only one paper on intestinal tuberculosis has appeared during recent years (Maxwell, 1939), which dealt mainly with symptomatology and in which the high mortality associated with this complication was held to have discouraged investigation. In America, as a result of the intensive studies of Brown and Sampson (1926), more attention has been paid to therapeutics, for these writers proved that intestinal tuberculosis need not necessarily be a terminal manifestation. They pointed out that the classical symptoms of diarrhoea, wasting and abdominal pain did not appear until the lesions were well established, indicated clinical findings suggestive of early lesions, and they emphasised the value of radiology in diagnosis. More important still, they showed conclusively that many of these early cases could make a satisfactory recovery.

Following on the work of Brown and Sampson, papers on this subject have appeared at intervals, chiefly in American and Canadian journals. But little has been added to our knowledge, and there still appears to be a tendency to regard intestinal tuberculosis as a complication carrying a uniformly fatal prognosis.

Communications published during the years of war include one by Burke and Aronovitch (1941), in which a series of 226 cases of pulmonary tuberculosis, all moderately or far advanced, showed a 31.4 per cent. incidence of intestinal lesions on X-ray examination. These writers believed that the development of intestinal disease was related to a deficiency of vitamins C and D and advocated a vitamin supplement for all cases of advanced pulmonary disease. Kennedy *et al.* (1941) studied a series of 120 cases, again occurring in far-advanced

pulmonary disease, which they treated with a low-residue diet containing ample protein, minerals and vitamins. Their results consisted of a series of charts showing a satisfactory gain in weight in individual patients receiving this diet. Frimodt-Møller (1943) reports the treatment of 64 cases of intestinal disease with heliotherapy and a high vitamin diet. He considered that a general beneficial effect followed this régime, but gave no definite detailed results. Hardt *et al.* (1939) studied 238 cases, the greater number of whom had also advanced pulmonary lesions, which they treated with calcium, high vitamin diet and ultra-violet light. They concluded that those receiving calcium showed a more definite improvement than those receiving only a high vitamin diet with or without ultra-violet light.

These papers suggest that we are still in danger of regarding intestinal disease as confined to the advanced pulmonary group, and consequently of overlooking cases which occur in association with more limited pulmonary lesions and which, if recognised in time, can and do respond to intensive treatment. The following examples are recorded to draw attention to this possibility.

Case Records

CASE NO. 1.—Male æt. 42. Admitted January 16, 1942, with a history of cough, sputum and lassitude for the preceding six months. Sputum averaged $\frac{1}{4}$ ounce daily and contained numerous tubercle bacilli. B.S.R. 23 mm. No symptoms of alimentary dysfunction on admission. Chest X-ray showed infiltration in right upper and mid zones with cavitation in the upper zone. A right A.P. was induced shortly after admission and four weeks later adhesions were divided. Following adhesion section a pleural effusion developed with considerable constitutional disturbance, and very gradually the pneumothorax space obliterated. First digestive symptoms appeared in April, 1942, when patient complained of occasional epigastric discomfort and heartburn. These symptoms were transient and at the beginning gave rise to no anxiety. They recurred at intervals throughout the remainder of the year, but were never associated with diarrhoea and the patient's general condition was unaffected. It was proposed to carry out a right thoracoplasty early in 1943, but in January the vague digestive symptoms became more persistent, the heartburn and epigastric discomfort being then associated with flatulence, anorexia and loss of weight. The possibility of an intestinal focus was considered and a barium X-ray showed involvement of the internal ileum and cæcum with considerable thickening amounting almost to a tumour mass. The patient was treated by means of a low-residue, high-vitamin diet, localised exposures of ultra-violet light three times weekly, and the intravenous injection of 5 c.c. of a 20 per cent. solution of calcium gluconate on alternate days. A rapid improvement followed within a few weeks, the digestive symptoms subsided, and a right thoracoplasty in two stages was carried out in the late spring of that year. Convalescence was slow but uneventful, and the patient was finally discharged in December, 1943. Follow-up in 1947 indicated that the patient was very well, at full work, and completely free from all digestive symptoms.

CASE NO. 2.—Female æt. 24. Admitted July 23, 1942, with a history of lassitude, cough and hæmoptysis for the preceding two months. Sputum averaged three to four pieces daily and contained fairly numerous tubercle bacilli. B.S.R. 37 mm. No digestive symptoms on admission. Chest X-ray showed slight infiltration in the right upper zone, while in the left lung there

was fairly extensive infiltration in the upper third with a moderate-sized cavity.

A left A.P. was begun shortly after admission, the collapse being made effective by adhesion section. In September patient began to complain of anorexia and occasional nausea associated with loss of weight. This was attributed to extension of the disease in the right lung, for which a right A.P. was induced. For a time the digestive symptoms subsided, but the patient failed to gain weight, and in February, 1944, was complaining of right-sided abdominal discomfort. Intestinal tuberculosis appeared a likely explanation and the diagnosis was confirmed radiologically, barium X-rays showing an ulcerative lesion in the ileocaecal region limited in extent. Treatment by means of low-residue, high-vitamin diet, U.V.L. and intravenous calcium gluconate was initiated at once with a good response. Discomfort and anorexia disappeared and the abdominal condition gave no further trouble. The patient eventually had a right upper thoracoplasty and was finally discharged from the sanatorium in 1946. She has been seen at regular intervals since discharge and is very well.

CASE NO. 3.—Male æt. 20. Admitted October 16, 1942, with a history of left pleural effusion three years previously. From this he had made a satisfactory recovery, and remained apparently well until two months before admission, when he had a hæmoptysis. He denied cough and sputum, but X-ray showed extensive infiltration throughout the left lung with cavitation, and a positive sputum was eventually found. B.S.R. 41 mm. No abdominal symptoms.

An attempt to establish a left A.P. failed, and in spite of strict bed-rest the patient's condition deteriorated, with loss of weight and X-ray evidence of extension of the disease in the left lung. After four months patient complained of epigastric discomfort, flatulence and occasional transient attacks of colicky pain in the lower abdomen, with diarrhoea. A barium X-ray was carried out in April, 1943, when it was reported that the last 3 or 4 inches of the ileum and the ascending colon showed a condition of marked spastic hyperactivity. A barium enema confirmed the presence of an ulcerative lesion of the cæcum, ascending colon and terminal ileum, with little or no evidence of hyperplastic reaction. Treatment with high-vitamin diet, U.V.L. and intravenous calcium produced immediate and dramatic results. Discomfort, diarrhoea and anorexia disappeared within a few days, gain in weight proceeded steadily, and by August patient had put on a total of 17 pounds. A further barium examination was carried out in the beginning of 1944 which showed that, while the bowel lesion had extended in the interim to involve the transverse and descending colon, there was now evidence of considerable scarring and contraction. Clinically the patient was very much improved, the gain in weight being now 26 pounds; all abdominal symptoms had disappeared, and the bowel movements were perfectly normal and regular. A left thoracoplasty was carried out later in the year with highly satisfactory results, and the patient was finally discharged in March, 1945. He has been seen at intervals since and has remained in excellent health, leading a full and busy life.

CASE NO. 4.—Male æt. 30. Admitted October 22, 1943, with a history of lassitude, cough and sputum for the previous five months: sputum averaged about $\frac{1}{2}$ ounce daily and contained numerous tubercle bacilli. B.S.R. 22 mm. Digestive system apparently normal. Chest X-ray showed infiltration in right upper and mid zones with cavitation. A right A.P. was begun on

November 26 and, following adhesion section, a satisfactory collapse was obtained. About six weeks after admission patient complained of occasional attacks of colicky pain in the lower abdomen, associated with diarrhoea. Appetite was poor and there was a slow but steady loss in weight. Barium examination of the intestine showed localised inflammatory changes involving the terminal 6 inches of the ileum, with ulceration. The usual line of treatment with vitamins, U.V.L. and calcium was instituted and relief of symptoms followed immediately. Diarrhoea and pain ceased, appetite improved and the patient gained weight steadily. Progress was uninterrupted until his discharge from the sanatorium in August, 1944. Subsequent follow-up found the patient well, free from all symptoms and carrying on full work.

CASE No. 5.—Male æt. 20. Admitted October 3, 1944, with a history of lassitude, cough and sputum for the preceding three months. Sputum confined to two or three pieces daily, but contained numerous tubercle bacilli. B.S.R. 49 mm. No digestive symptoms. X-ray of chest showed infiltration involving the upper halves of both lungs. Patient was treated by means of strict bed-rest, but showed little response. After five months he complained of anorexia, and had occasional loose motions associated with abdominal discomfort and loss of weight. X-ray examination showed tuberculous involvement of cæcum and ascending colon, with ulceration. A satisfactory response followed treatment by vitamins, U.V.L. and calcium, improvement in symptoms being immediate. Abdominal discomfort vanished, bowel movements became normal within a fortnight and patient began to gain weight. At the time of writing the patient is awaiting a left thoracoplasty; his general condition is satisfactory and he has been completely free from all digestive symptoms for over eighteen months.

CASE No. 6.—Male æt. 39. Admitted November 19, 1943, with a history of cough and lassitude since the previous July. Sputum moderate in amount (four to five pieces daily), but contained many tubercle bacilli. B.S.R. 10 mm. No digestive symptoms. Chest X-ray showed scattered infiltration in right upper and mid zones, with cavitation in mid zone. Patient was treated by means of bed-rest in the first instance, with some general improvement, but after two months the X-ray appearances were unaltered and accordingly a right A.P. was induced. The collapse was unsatisfactory owing to extensive adhesions, and the pneumothorax was terminated and replaced by phrenic paralysis. The pulmonary lesion, however, remained unaltered, and despite continued strict bed-rest there was no evidence of healing. Five months after admission patient began to complain of epigastric discomfort and flatulence, followed a week or two later by complaints of lower abdominal pain and occasional diarrhoea. Barium X-rays showed disease of the terminal 3 inches of the ileum and of the cæcum. Apart from some temporary relief of the abdominal pain no benefit resulted from the usual régime of vitamins, U.V.L. and calcium in this case, and the succeeding months showed a deterioration in the lung condition, with extension of the disease on the right side, followed by a spread to the left. A left A.P. failed and the patient slid steadily downhill. The symptoms of intestinal tuberculosis increased steadily in severity and the patient died on May 14, 1945.

Discussion

These cases have been selected for publication from the clinical material seen in a sanatorium during the past six years, and are put forward as a reminder that intestinal tuberculosis is not invariably a terminal phenomenon nor is it associated only with advanced pulmonary disease. The cases recorded

all showed pulmonary cavitation, all had positive sputa, but all were considered suitable for collapse therapy and, with the exception of Case No. 6, all have made or are making an entirely satisfactory recovery. The part played in this recovery by the routine treatment adopted for the intestinal disease is difficult to assess. The major portion of the credit for the ultimate result must be given to the successful collapse of the diseased lung and the consequent cessation of the stream of infective material flowing down the intestinal canal from the pulmonary cavity. One cannot ignore the fact, however, that symptomatic and general improvement occurred in several of these cases following the institution of treatment for the intestinal lesion and before collapse therapy was begun, and that it was due to their general improvement that surgical collapse was made possible. It will be noted that in Case No. 6 effective collapse proved impossible, and in this case treatment for the intestinal disease produced only some transient amelioration of symptoms.

Treatment in each case was the same. An ordinary full diet, but with all roughage eliminated, was given, supplemented by vitamins A and D in concentrated form and by 300 mgms. of ascorbic acid daily. Calcium gluconate, 5 c.c. of a 20 per cent. solution, was administered thrice weekly by intravenous injection. Ultra-violet light was used cautiously, the chest being kept covered, and was well tolerated in all cases.

While we cannot, of course, draw any authoritative conclusions from a small series of individual cases such as this, one is, perhaps, justified in recording one's impression that the treatment outlined proved of considerable assistance in five of the cases and was at least responsible for a dramatic relief of symptoms. This symptomatic relief was succeeded by sufficient improvement in the general condition to enable the position to be consolidated by the successful completion of pulmonary collapse.

Summary

Six cases of intestinal tuberculosis, occurring in association with moderately extensive pulmonary disease, are recorded.

An account is given of their treatment with a low-residue, high-vitamin diet, calcium and ultra-violet light.

It is suggested that this régime is of considerable value in such cases, but that the permanency of any result achieved is dependent upon effective control of the parent lesion in the lung.

The barium examinations in these cases were carried out by Dr. J. E. Blewett, radiologist to the Aberdeen Royal Infirmary, to whom I am greatly indebted for the interest which he took in their investigation.

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AN OBSCURE CASE OF LYMPHADENOPATHY WITH PULMONARY FIBROSIS

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THE patient, a man aged 59, was sent to one of us (M.D.) by Dr. F. E. Graham-Bonnalie, of Hove, with a provisional diagnosis of pulmonary moniliasis. He had suffered from an extensive rash all over his body (the face excepted), for which he had consulted Dr. H. W. Barber, who regarded it as pityriasis lichenoides. About the same time he was complaining of increasing shortness of breath with cough. For some weeks before I saw him in London on April 3, 1946, he had been extremely ill and Dr. Graham-Bonnalie had found signs of generalised bronchitis; dyspnoea was marked, and there was much cough with copious expectoration. Repeated examinations of the sputum for T.B. were negative, but cultures of sputum showed a heavy growth of *Monilia albicans*. X-ray examination of the chest showed extensive mottling of the lung-fields which was thought to be indicative of chronic miliary tuberculosis. In view of the presence of monilia in the sputum he was given full doses of iodine of potassium, but after some days this produced a profuse bronchorrhoea and the patient became so ill and his respiratory distress so great that the drug was discontinued, after which there was some improvement in his condition.

When I examined him shortly after his arrival in London he was much better and physical signs of bronchitis were minimal. The dyspnoea, though present in some degree, was not severe; examination of the cardio-vascular system showed nothing of material significance; nothing abnormal was found on abdominal examination.

X-ray examination of the chest showed the appearances seen in Fig. 1. The most obvious feature appeared to be the enlargement of the hilar lymph nodes. The irregular mottling and reticulation of the lung-fields might have been explained as due to lymphatic stasis caused by pressure from the enlarged glands, though in view of the clinical history of progressive dyspnoea it seemed more probable that they were associated with a widely distributed interstitial fibrosis. The radiological picture was consistent with Boeck's sarcoidosis, and this was regarded as a more probable diagnosis than chronic miliary tuberculosis, the gross enlargement of the hilar lymph nodes being in favour of the former. The presence of monilia in the sputum, albeit in large quantities, was thought to be incidental, a pathological curiosity rather than an aetiological factor. The patient was feeling a good deal better and was anxious not to make a prolonged stay in hospital, so he was sent home to rest quietly for a few weeks and advised to keep in touch and to be seen again before resuming work.

Nothing further was heard of him until August 23, when an urgent message was received from Dr. Brian Rayner of Wimbledon, who had been called in to see the patient and had admitted him to hospital in a serious condition. He was then extremely dyspnoeic and cyanosed, with signs of extensive bronchitis and with bubbling râles at both bases. He complained of

PLATE I



FIG. 1.—RADIOGRAPH OF CHEST.

Radiogram (postero-anterior view) showing gross enlargement of the hilar lymph-nodes and reticulation of the lung-fields with irregular mottling.

PLATE II



FIG. 2.

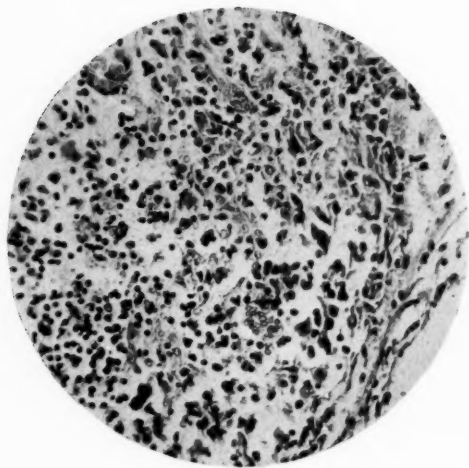


FIG. 3.

[To face Page 39.]

pain in the right side of the chest and had pleural friction low down in the right axilla. On the following day he was somewhat better, though still obviously a very sick man. The temperature chart showed an irregular pyrexia, with an evening rise up to 101° F. He had been given a hypodermic injection of atropine $\frac{1}{16}$ grain the day before and his fluid intake had been restricted; the coarse moist sounds at the base were considerably less, but there was still considerable wheezing and bronchial spasm, and there were signs of dry pleurisy at the right base. There was copious expectoration of muco-purulent sputum which contained appreciable amounts of bright blood. A portable X-ray picture showed appearances similar to those of previous radiograms, there being no appreciable change.

No enlargement of the liver or spleen was detected on abdominal examination. There was nothing of material significance seen in the throat. The remaining teeth (lower incisors) were in a very septic condition; apart from this there was no obvious focus of gross infection.

After discussion Dr. Rayner and I agreed that there was no specific remedy that was indicated and that the only thing we could do was to deal with the patient's condition on general principles. It was decided to ask an otolaryngologist to investigate the upper respiratory tract with special reference to the nasal accessory sinuses, to have the septic teeth removed as soon as the patient's general condition warranted such intervention, and to have further cultures of the sputum to see if there was any indication for the administration of penicillin. These measures we proposed to adopt with the idea that we were dealing with a case of Boeck's sarcoidosis in which infection of the respiratory tract with some secondary organism had caused an acute exacerbation of symptoms.

On August 30 a blood count showed: red cells = 5,050,000; hæmoglobin = 88 per cent.; white cells = 88,000; differential count: polymorphs, 47 per cent.; small lymphocytes, 1.5 per cent.; immature cells, 51.5 per cent.

The immature white cells appeared to be mainly myeloblasts, but some lymphoblasts were present.

The question of treatment by X-rays (low-voltage doses) was considered and discussed, but the patient's condition became rapidly worse, and he died on September 2, apparently from the sudden failure of the right side of the heart.

An autopsy was performed by Dr. W. F. Hamilton, to whom I am indebted for the following notes on the chief macroscopic details. On opening the body some free fluid was found in the peritoneal cavity. No enlargement of any of the abdominal glands was noted. The liver was smooth, slightly enlarged, and on section showed slight fatty and nutmeg changes. The kidneys were slightly enlarged and congested. The spleen was enlarged (weighing 25 ounces) and was very soft and friable; the capsule was thickened and there were some adhesions. The heart was enlarged and the great veins appeared much dilated; there was no excess of fluid in the pericardial sac. Some fluid was present in both pleural cavities, more in the right than in the left. Some recent pleural adhesions were present at the right base; a few adhesions, recent and easily broken down, were present at both apices. The lungs were bulky and emphysematous. The paratracheal glands and the glands near the bifurcation and

along the main bronchi were enlarged. On section of the lungs it was evident that there was considerable diffuse generalised fibrosis.

The thoracic viscera, the spleen, portions of the kidneys, the ribs, and of the skin were placed in formalin without further detailed examination, pending historical examination.

MORBID ANATOMY OF POST-MORTEM MATERIAL

The specimens received were as follows:

- (a) The thoracic viscera, comprising the heart, lungs, the trachea and mediastinal lymph glands.
- (b) The spleen.
- (c) A portion of liver tissue.

The lungs were bulky and of firm consistency. There was no pneumonic consolidation, but there was evidence of diffuse fibrosis throughout the pulmonary parenchyma. The pleura showed several mottled areas of hæmorrhage and there was a little fibrinous pleurisy at the right base.

Hemisection of the right lung (Fig. 2) showed that the cut surface was heterogeneous. The apex was honeycombed owing to emphysema, there was slight bronchiectasis, and the hilum and base were of very firm consistency due to brown induration and fibrosis. The pleura was thickened over the diaphragmatic aspect.

Hemisection of the left lung presented a similar macroscopic appearance.

Dissection of the mediastinum revealed several moderately enlarged lymph nodes, the largest having a maximum diameter of 3.5 cms. These were of firm consistency and on hemisection presented a fibrous granular appearance.

The heart was grossly enlarged and showed dilatation of its right chambers. The heart muscle was firm in consistency but pale in colour. No gross valvular lesions were discovered. The coronary arteries and aorta were free from atheromatous degeneration.

The spleen was grossly enlarged, having a maximum diameter of 18 cms. The surface was smooth, the colour rather pale and the consistency soft. On hemisection, the cut surface appeared uniform.

HISTOLOGICAL EXAMINATION OF POST-MORTEM TISSUES

Seven representative *lymph nodes* from the mediastinum were examined. These showed small foci having the characteristic morphology of sarcoidosis situated in the subcapsular zone and in the medullary sinuses. These foci consisted merely of the small collections of so-called "epithelioid" cells; no characteristic giant cells were seen. In the largest gland, which measured 3.5 cms. in diameter, the "epithelioid" cells could be seen extending along communicating sinuses between the subcapsular and the medullary sinuses (Fig. 3).

A notable feature of these lymph nodes was the extensive and diffuse infiltration of the lymphadenoid parenchyma with plasma cells. The follicles were normal in appearance and showed no reticulo-endothelial hyperplasia. The plasma-celled infiltration may probably be correlated with the heavy

infection of the sputum with *Monilia albicans*. In addition the bloodvessels and some of the sinuses contained large numbers of primitive cells of the myeloid series.

Liver.—The hepatic parenchyma showed marked congestion with atrophy of the cells in the region of the central lobular vein. There was some slight lymphocytic infiltration of the portal areas, but not such as to indicate lymphatic leukæmia. Focal necrosis was present and there was some brown atrophy.

Skin.—There was slight hyperkeratosis together with a localised necrotic slough. The epidermis showed a little irregular hyperplasia and occasional mitotic figures were encountered. The superficial fibres of the corium were infiltrated with lymphocytes and eosinophilous cells in large numbers and the capillaries were dilated. The deeper fibres of the corium showed no apparent abnormality other than slight hyalinisation.

Lung.—The intervesicular capillaries were intensely congested and there was much fibrosis associated with focal areas of collapse, bronchitis and bronchiectasis. The pleura was markedly thickened and showed a fibrinous exudate. The capillaries in the pleura were congested and there were multiple foci of interstitial haemorrhage. No moniliform organisms were demonstrable in the bronchioles.

Kidney.—The staining reaction was almost lost owing to post-mortem autolysis. The glomeruli, however, were prominent. There was congestion of the pyramidal vessels. Some arterio-sclerosis was present and there were subcortical areas of lymphocytic infiltration.

Spleen.—The splenic pulp was intensely congested and the Malpighian bodies were inconspicuous. Occasional small foci showing the morphology of sarcoidosis were present. There was slight hyalinisation of the media of the arterioles.

Bone Marrow.—The characteristic histological picture of chronic myeloid leukæmia was well shown. The fatty tissue was almost completely replaced by myeloblasts and myelocytes of various types. Lymphocytes were present in relatively scanty numbers.

Comment

This case appeared to us to be of unusual interest on account of the multiple pathological phenomena, between which it seems impossible to trace any definite association, and which must, therefore, be regarded as presenting themselves independently in the same individual. The chronic skin lesions, apart from the natural apprehension and disgust which such a condition occasions in any patient, do not seem to have constituted a serious disability. The chief trouble from the general physician's point of view was the dyspnoea and associated bronchitis. The infection with monilia we can hardly regard otherwise than as a pathological incident which we do not look upon as having any ætiological importance in relation to the gross pulmonary fibrosis. The "tea-taster's cough," common in Ceylon and generally described as a form of broncho-moniliasis, appears to be a well-recognised condition, its inclusion among the occupational diseases depending on the fact that the monilia fungus is frequently found in the tea dust. In Castellani's original accounts published in 1905 two types were recognised, the first a mild affection which seems to be

little more than a specific form of bronchitis, the second a severe condition characterised by intermittent fever, considerable constitutional disturbance, muco-purulent expectoration with hæmoptysis, and a clinical picture which generally resembles that of chronic ulcerative phthisis. Monilia infections are extremely uncommon in this country, and although there are cases reported from abroad which suggest that a specific form of bronchitis with subsequent structural damage to the lungs is a definite clinical entity, we feel that a diagnosis of pulmonary moniliasis in a patient who has not been exposed to peculiar conditions in the East should be regarded with no little suspicion.

In this case the radiological appearances were characteristic of pulmonary sarcoidosis and the clinical diagnosis of Boeck's sarcoid was confirmed by the histological changes noted in the lymph nodes and in the spleen. It is well known that, although the outlook in the majority of these patients is relatively good, there are cases in which the early changes in the reticular tissue of the lungs is eventually succeeded by gross and permanent fibrosis, death being ultimately due, as in this instance, to secondary cardiac failure. It is a little surprising, in view of the gross fibrotic changes in both lungs indicative of the chronicity of the disease, that the changes in the mediastinal lymph nodes, though consistent with sarcoidosis (and indeed the histological appearances can hardly be attributed to any other condition), should not have been even more characteristic and have shown the typical giant cells usually seen in such cases.

The blood picture was a very definite feature and can only be explained by the hypothesis that the patient was suffering from a chronic type of leukæmia which had existed as an independent pathological state and which was not related to the disease of the reticulo-endothelial system. Rare cases of chronic leukæmia are on record in which the radiological picture in the chest is suggestive of marked changes in the lungs, and X-ray therapy with low-voltage doses has resulted in appreciable clearing up of the conditions in the chest. The lymphocytic deposits in the lungs are a well-recognised feature in ordinary leukæmic patients, but are not such as to give rise to any obvious clinico-radiological picture during life.

Our acknowledgments and thanks are due to Dr. Brian Rayner and to Dr. W. F. Hamilton, by whose courtesy we were enabled to get the abundant material necessary for complete pathological investigation of the case; and to Dr. F. E. Graham-Bonnie, to whom we are indebted for the earlier clinical details and for the reports on the examinations of the sputum for monilia.

THE SIGNIFICANCE OF THE NEGATIVE TUBERCULIN TEST

By B. COUTS

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In discussions in the past on the tuberculin test, doubt was sometimes expressed about the significance and value of the negative reaction. In theory, all infected persons, including, of course, all cases of clinical tuberculosis, gave

positive reactions, and the uninfected correspondingly gave negative reactions. This simple state of affairs was complicated by the disturbing fact that many writers had reported cases of clinical tuberculosis with negative tuberculin reactions.

The problem of the clinical value of the negative reaction can be presented under three headings. First, is it true that all infected persons are positive reactors to tuberculin? Secondly, do positive reactors ever lose skin sensitivity and become negative reactors? Thirdly, are negative reactors, for example, in adult life sufficiently numerous to make tuberculin testing worth while?

THE NEGATIVE REACTION IN CLINICAL TUBERCULOSIS

Most of the writers reporting negative reactions in clinical cases used either the Von Pirquet test (Von Ruck, 1909) or the Mantoux test with 0.1 mg. Old Tuberculin (Maxwell, 1930; Moncrieff, 1931).

These tests are probably approximately equal in sensitivity, and produce reactions in most cases of clinical tuberculosis. There is no doubt, however, that a certain number of patients do fail to react, and that, as a result, absolute reliance cannot be placed on these tests so far as negative reactions are concerned.

This state of affairs altered when higher doses of tuberculin began to be used more frequently in the Mantoux test. With the injection of 1 mg., 10 mg., or even 100 mg.—*i.e.*, undiluted Old Tuberculin—almost all cases of tuberculosis could be made to react. There were, however, a small number of cases which failed to react to even the highest doses of tuberculin. These were often meningeal or miliary in type, or moribund cases of phthisis. This group did not number usually more than about 2 per cent., and in some series was almost non-existent (D'Arcy Hart, 1932; Lyle Cummins, 1933; Long *et al.*, 1935; Vollmer, 1938).

It may be accepted at the present time that almost all clinical cases of tuberculosis will respond to tuberculin, a small percentage requiring large doses to evoke a reaction. A further very small percentage will fail to produce a reaction even to undiluted tuberculin. From the statistical point of view this group is so small as to be of little significance; from the clinical point of view the group should be remembered. This applies particularly in children.

Even when these exceptional cases have been considered it remains that a definitely negative tuberculin test, adequate dosage having been used, is a very strong indication of the absence of clinical tuberculosis.

THE NEGATIVE REACTION IN TUBERCULISED PERSONS

The next point is whether all persons, merely infected, react positively to tuberculin. It is not always possible to answer this question dogmatically, since in the absence of clinical tuberculosis, and without radiological evidence of infection, only the tuberculin test can furnish the required information. It is indeed certain that, as in the case of clinical tuberculosis, occasional tuberculin tests, even where full dosage has been employed, give misleading results. Tuberculised subjects' skin sensitivity varies within wide limits, and it is necessary to use a dosage of 1 mg. Old Tuberculin before a negative reaction

can be trusted. (Since stronger dilutions do not produce many more reactions, and there is always the danger of an excessive reaction with œdema and vesiculation, it is not worth while in ordinary work using a larger dose than 1 mg.) Many surveys in the past have shown that nearly all adults—not cases of tuberculosis—were positive reactors (*e.g.*, Opie and McPhedran, 1926; Heimbeck, 1929; Lyle Cummins, 1933). Since all, or nearly all (95 per cent. or more), of these adults tested reacted positively, it seems reasonable to assume that, for practical purposes, infected persons, not actively ill, usually react positively to the tuberculin test, the percentage of reactors increasing with the use of larger doses of tuberculin, until with the injection of 1 mg. Old Tuberculin almost all reactors are discovered.

THE LATENT PERIOD FOLLOWING INFECTION

A special class of negative reactor requires mention here. This is the subject who has been recently infected, but has not yet acquired skin sensitivity. It is stated (Wallgren, 1941) that about four to seven weeks elapse between first infection and development of skin allergy. This is an important point in clinical work among the young. In suspicious cases with negative skin tests it may be useful to repeat the test after an interval of a few weeks.

DESENSITISATION BY TUBERCULIN

Another but less important source of false negative reactions is the subject who has been desensitised by repeated doses of tuberculin. It is possible, by injecting large doses, to desensitise and produce a state of skin "anergy." This, it is well known, is sometimes done by farmers wishing to pass an animal as tuberculin negative. The usual doses employed in the tuberculin test in man are not likely to desensitise. They are, indeed, found to increase the reaction to subsequent injections of tuberculin (Forbes, 1938).

OTHER FACTORS INFLUENCING THE REACTION

Most tuberculous skin diseases are associated with high sensitivity to tuberculin, particularly the tuberculides, which are an expression of the body's allergic response to infection. A group of skin diseases does exist, however, believed by some to be tuberculous in origin, in which the majority of subjects show definite tuberculin "anergy." Of these, sarcoidosis is the best known, and a negative tuberculin reaction in a suspect case in an adult is helpful confirmatory evidence. There is also some evidence that the presence of acne tends to lessen the frequency of positive reactions to tuberculin, as to other bacterial products (Lynch, 1944). In common with cases of clinical tuberculosis, sensitised subjects may show depressed reactivity when suffering from advanced disease or toxic conditions of a non-tuberculous character. Measles and scarlet fever are particularly known to cause this in childhood (Westwater, 1935). The rash in these specific fevers may alter skin sensitivity for a period. The tuberculin response has also been reported, probably erroneously, to be affected by pregnancy, menstruation, senility, debility, etc.

THE PERSISTENCE OF POSITIVE REACTIONS

The question of the permanence of positive reactions may now be discussed. This is an important and rather controversial point, and is bound up with the interpretation of minor abnormalities seen in chest radiographs.

It was at first generally thought that positive reactors remained so throughout their lives. This was due either to the original stimulus of the primary infection, or to the continued presence of living tubercle bacilli in the primary complex, particularly in the hilar glands, or to the "boosting" effect of repeated reinfections through the course of the years.

In view of the persistence of the positive reactions the incidence of sensitisation to tuberculin could be regarded as equivalent to the incidence of the number of persons who had ever been infected—*i.e.*, the attack incidence of infection.

Towards the end of life, in the latter years, the reaction occasionally became negative. This "senile anergy" was due either to the fading of the allergic response after complete healing of the lesion or to the failing powers of the body, with resultant loss of skin sensitivity. Whichever the case, the elderly often showed some decline in the incidence of positive reactions (Pascher *et al.*, 1941; Amazon, 1943). Apart from the aged, who constituted a special group, the persistence of reactions in the child and adult was of importance to the epidemiologist as well as to the clinician. If positive reactions frequently became negative, then tuberculin surveys revealed only a part of the population which had been infected and the sensitisation incidence was not equivalent to the attack incidence of infection. On the other hand, if, after the healing of lesions, the tuberculin test usually became negative, then the sensitisation incidence was rather equivalent to the incidence of unhealed (*i.e.*, active) infections in the community tested.

If the first supposition were true, the value of the test considerably lessened; if the second, the standing of the test changed and a new value appeared.

Animal experiments in the past have shown that, with the healing of a tuberculous process, tuberculin sensitivity often gradually wanes (Krause, 1916, 1927; Willis, 1928). The allergy is not completely lost, however, for larger doses of tuberculin than usually employed succeed in producing a response (Willis, 1928). Many clinical observations were also made (Heimbeck, 1927, 1929; Opie, 1930) describing the loss of skin sensitivity in man following the healing of tuberculous disease, but in those cases the Mantoux test was not employed with the largest doses, and there is therefore the possibility that the skin sensitivity had merely lessened, and not completely disappeared.

When routine testing of contacts and of children became frequent, more information became available. When Lloyd and MacPherson in 1933 retested 1,200 children who had been examined at the Brompton Hospital in 1931, they found that 96 per cent. of the positive reactors were still positive, but that 4 per cent. had become negative. If only those were considered who were fully tested (1 mg. O.T.), then merely 6 cases (2 per cent.) had lost their sensitivity. Of the positive reactors, very few showed lessened allergy, but one-half of the total number showed increase in their skin sensitivity.

A similar review by D. Zacks (1942) of more than 1,000 feeble-minded

subjects in an institution in the United States who had been tested ten years previously showed that an average of 3 per cent. changed from positive to negative reactions. The greatest change, 12.7 per cent., occurred in children aged 5-14 years, while the smallest change, 1 per cent., occurred in those over 20 years. Similar findings were reported by Dahlstrom (1940) from the Henry Phipps Institute when contacts were examined over a period of ten years. In the Prophit Survey of young adults F. Ridehalgh (1942) also found 1 to 2 per cent. of the positive reactors becoming negative each year. Some of these may never have been definitely positive reactors, as Ridehalgh accepted very small reactions. In a careful investigation Törnell (1943) calculated that only 0.1 per cent. of the positive reactions changed annually to negative reactions.

It was commonly observed that many of those who became negative reactors had originally given rather feeble reactions. Further tests with full doses of tuberculin might possibly have succeeded in procuring positive reactions. It was the case that the skin allergy tended to decrease less frequently as contact was maintained with a case of tuberculosis. In Dahlstrom's series only $1\frac{1}{2}$ per cent. of his positive reactors who were in continuous contact with sputum positive cases became negative reactors. (It is possible that in Dahlstrom's cases many of the reactions which failed to be repeated had originally been only pseudo-reactions to large doses of purified protein derivative.)

Radiographic examination of the chest has tended to confirm the view that some infected subjects have negative reactions. Very many observers (Amazon, 1943; Ridehalgh, 1942; Savage, 1941; Lumsden *et al.*, 1939; Crimm and Short, 1939) have reported the finding in tuberculin-negative persons of lesions thought to be tuberculous in nature. These lesions are of the "primary complex" type, or more often consist of hilar glands without a visible primary focus, are usually calcified, and apparently healed. The percentage reported has varied widely.

The recognition of abnormalities in the pulmonary hilar shadows is often difficult and opinions may vary. Amazon (1943), submitting a series of routine radiographs to several observers, found their estimates of evidence of tuberculous infection to range from 22 to 62 per cent.

In addition, all enlarged hilar shadows or calcified hilar or pulmonary lesions are not necessarily due to tuberculous infection, although the great majority are. Some caution is therefore required in accepting the figures of the writers mentioned previously. There do, however, undoubtedly exist a number of persons with radiological evidence of healed primary infection with negative tuberculin reactions. This group, a small proportion of those giving negative tuberculin reactions, confirms the reports that a certain number of positive reactors change to negative reactors in the course of time. It is possible that some of these may never have been positive. It is probably untrue to say, as Allen (1932) maintains, that skin sensitivity can be lost in short periods of time. The evidence rather suggests that the change takes place gradually over a period of several months, if not years. Again, the statement by Pottenger and Pottenger (1943) that children with hay fever, asthma, etc., treated with a special diet and adrenal cortex become less "allergic" generally, and often lose their tuberculin sensitivity, requires further confirmation.

The position, then, of the tuberculin test is as follows: As far as is known, most reactors remain positive throughout life. A very small proportion become negative in the passage of time, presumably with the healing of slight, usually primary, infections; a larger proportion become negative in old age, possibly for the same reason.

A tuberculin survey reveals nearly, but not quite, all those who have been infected at any time. A small proportion of persons with healed and obsolete infections is missed. The sensitisation incidence is therefore nearly equal to the attack incidence of tuberculous infection. This is probably the position obtaining in this country, and it gives the tuberculin test a place of importance in the estimation of the tuberculosis problem.

FREQUENCY OF NEGATIVE REACTIONS

The frequency of negative reactions is a crucial point in tuberculin testing. Only where there is a reasonable chance of obtaining a negative reaction does the tuberculin test become worth while from a clinical point of view. As Mantoux said in 1910, "contrary to most clinical methods, the value of the intracutaneous test lies in negative results." Apart from clinical work, if sufficient persons are tuberculin negative, the test can be used in case-finding campaigns to eliminate the non-infected subjects, and concentrate attention on those sensitive to tuberculin.

Until ten or fifteen years ago it was generally believed by clinicians in this country that negative reactors were so rare as to make the tuberculin test not worth performing, since almost all patients were positive reactors. As a result the test was largely neglected. It began to be shown, however, that a large proportion of children of school age were non-reactors, particularly children who had not been in contact with "open" cases of pulmonary tuberculosis.

The tuberculin test thus became extremely useful in children, particularly those suspect of tuberculosis, and in contact work.

The point now arises as to whether the test can be of equal value in adolescents and adults—that is, whether improving conditions are causing primary infections to be delayed or even avoided in a reasonable proportion of the population. From a study of the various findings in recent reports and from the author's work (in the Press) it appears that the chance of encountering negative reactions in young adults not suffering from clinical tuberculosis is substantial, and that it is clinically worth while to perform this test at least to the age of 18 to 20 years approximately. After this age, when it may be that over three-quarters of the persons tested will produce positive reactions, it is probably not worth tuberculin testing as a routine measure. In particular or doubtful cases the test may be useful, especially in areas where tubercularisation is of a low order. Thus, in the United States at present in rural areas tuberculin tests in adults are a useful procedure. This may well apply also in some of our isolated communities, and is the state to which our population may proceed in the future. Even now, according to a Cambridgeshire survey performed by the author, it is possible to encounter a sample of an adult population which is not completely tubercularised, the figure being between 80 and 90 per cent.

In the Prophit Survey, Ridehalgh (1942) found that no less than 25 per cent. of the Irish nurses tested were tuberculin negative. His figures in this case are likely to err on the low side. There is, then, in clinical work a place for the tuberculin test in children and young adults.

The value of a negative test can thus be summarised:

1. Almost all persons negative to an adequate tuberculin test are free from clinical tuberculosis and have not been tuberculised. Infrequently a negative reactor may prove to be infected, or rarely to be a clinical case.
2. A few negative reactions are due to the waning of skin sensitivity with the passage of time in obsolete cases of infection.
3. Negative reactors are sufficiently numerous to make the test of practical value in children and young adults.

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MILIARY CARCINOMA OF THE LUNG

By C. F. HAWKINS

From the Queen Elizabeth Hospital, Birmingham

MILIARY shadows in the lung are not uncommon and are seen in a wide variety of diseases, which range from tuberculosis to bronchiolitis obliterans and the rarer forms of bronchopneumonia. Fortunately the diagnosis does not often

depend upon the radiograph alone, as there are other signs to help; but if these are not conclusive, the problem may be very difficult. There are, however, several features of the X-ray film which may assist in the differential diagnosis. Sometimes the shadow of the nodule itself may help, and the ragged dense appearance of silicotic opacities may be distinguished from the softer ones of miliary tuberculosis, where serial X-rays will show the gradual development of the snow-storm appearance. Again, the particular distribution throughout the lung fields may give a clue, as in congestive cardiac failure, where there is a gradual fading from the hilum to the periphery, which is not seen in other types. Finally, in some cases the nodulation may be superimposed upon a reticular background. This effect is produced by thickening of the bronchovascular striations. It appears in silicosis as well as in other conditions where the peribronchial lymphatics are engorged with inflammatory or neoplastic cells, and gives a lacework effect throughout the lung fields.

Mr. H. J., aged 47 years, was admitted to the Queen Elizabeth Hospital, Birmingham, on October 10, 1946, complaining of a cough and shortness of breath. His health previously had been good, and enquiry about his family and personal life resulted in nothing that was relevant to his complaint. However, his work involved cleaning heavy metal castings that were dry and still untrimmed. These were heavily coated with casting sand from the foundry; thus the atmosphere in which he worked was dense with particles of sand, and there seemed to be no adequate precautions taken against this. He mentioned that several of his colleagues suffered from symptoms similar to his, though much milder.

He first felt unwell about six months previously, when he developed "bronchitis." After spending a few days in bed he returned to work, but had been troubled with his breathing ever since. The shortness of breath was, at first, only noticed after walking about half a mile, but had progressively become worse, until two weeks before admission he was barely able to get upstairs. He had coughed a good deal, but produced no sputum until a few weeks previously, when he had several small hæmoptyses, on one occasion bringing up some clots of bright red blood. Although always a strong man he had felt weak and his weight had decreased about one stone in six months. He also added that he felt as if there was "something resting inside his chest."

On admission it was obvious that he was an ill man. He was pale, anxious, breathless and slightly cyanosed. Pulse 86, respirations 25, temperature 98.4°. His chest was moving less on the left side and breath sounds were diminished there as well. There was nothing abnormal in the percussion notes. Rhonchi of all types were heard throughout both lungs.

A few small, very hard glands were palpable in the right supraclavicular fossa.

The cardiovascular system appeared normal, but it was impossible to estimate the size of the heart owing to the presence of emphysema. Blood pressure 166/100.

A portable chest X-ray was taken and showed a picture of miliary nodules on a reticular background that was reported by the radiologist as pneumo-koniosis. In addition there were opaque areas in the middle and lower zones of the left lung suggestive of neoplasm, but similar to the areas of massive fibrosis that are a feature of the third stage of silicosis, although the latter occur more peripherally. The heart appeared quite normal. A diagnosis of silicosis was

made, with possible superadded tuberculosis. Oxygen was found to relieve both his distress in breathing and his cyanosis.

On October 15 he was much worse—breathing more rapid, pulse 100. He was running an evening pyrexia of 99°. Search for the tubercle bacillus had proved negative. It was considered important to exclude a bronchial neoplasm, but he was too ill for bronchoscopy. A course of sulphadiazine and penicillin was given, in order to reduce the infection in his lungs. By the 20th he appeared easier. His temperature was normal, and fewer rhonchi were heard in his chest. But he was still very cyanosed.

On the 22nd his pulse rate dropped suddenly to 40 per minute and the rhythm became irregular. On examination there was auricular fibrillation with early cardiac failure. As there then seemed a possibility that the miliary shadows resulted from pulmonary congestion the X-ray picture was considered again. But the shadows were obviously too evenly distributed for this. Two days later he died.

At the necropsy the body was that of a well-built man without wasting. There was no difficulty in removing the lungs, as the pleura were patent without any suggestion of the adherency that is so common in silicosis. On opening the bronchi a carcinoma was found almost occluding the left bronchus about 1 inch from the carina. The lungs were sodden with œdema, and scattered throughout them were miliary nodules of carcinoma, the diameter of these being about 3-4 mm. The growth had spread along the lymphatics of both lungs, and the reticular appearance was due to this peribronchial cuffing. The pleural surface showed in some places a beautiful outlining of the surface lymphatics, thrown in relief by the minute white beads of new tissue which were filling them. There were also small subpleural deposits and several emphysematous bullæ present.

A hæmorrhagic pericarditis was present, and the outline of the coronary arteries was accentuated by the white growth surrounding them. The heart, apart from this epicardial invasion of the neoplasm, was quite normal.

No metastases were found in the rest of the body, in spite of a careful search which included the brain. There was no evidence of silicosis.

Microscopy showed an anaplastic type of bronchial carcinoma.

Discussion

This is a rare form of carcinoma of the bronchus, and in contrast to the other types is bilateral. However, a picture of "lymphangitis carcinomatosa" of the lung is also produced by neoplasms elsewhere. Thus, a recent survey by Mueller and Sniffen indicates that as many as 70 per cent. of cases results from growths in the stomach, generally schirrous carcinomata. It is probable that retrograde permeation of the pulmonary lymphatics takes place following involvement of the mediastinal lymph nodes.

The cases that cause most difficulty are those showing a miliary infiltration of the lungs without a primary growth being apparent. It is then necessary to remember that the following conditions, as well as those already mentioned, can produce a similar appearance: sarcoidosis, lymphadenoma, leukæmia, amyloidosis of the lung and miliary stasis in mitral stenosis.

I should like to thank Dr. W. C. Smallwood for permission to record this case.

PLATE III

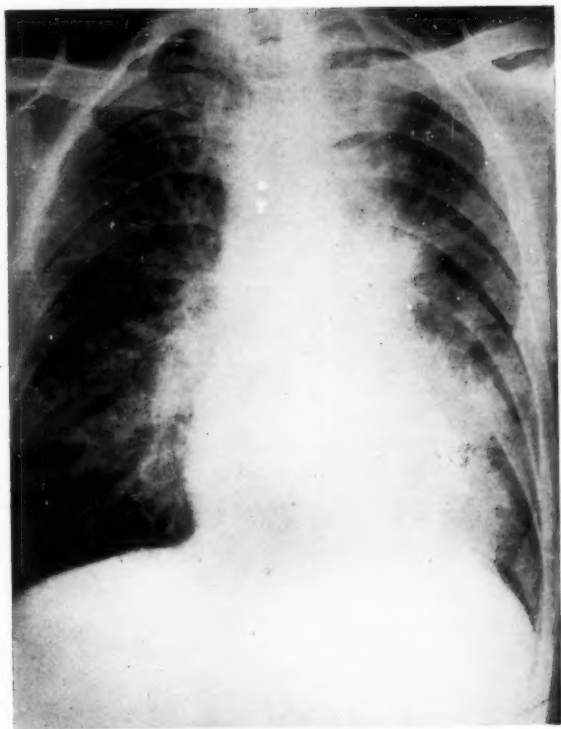
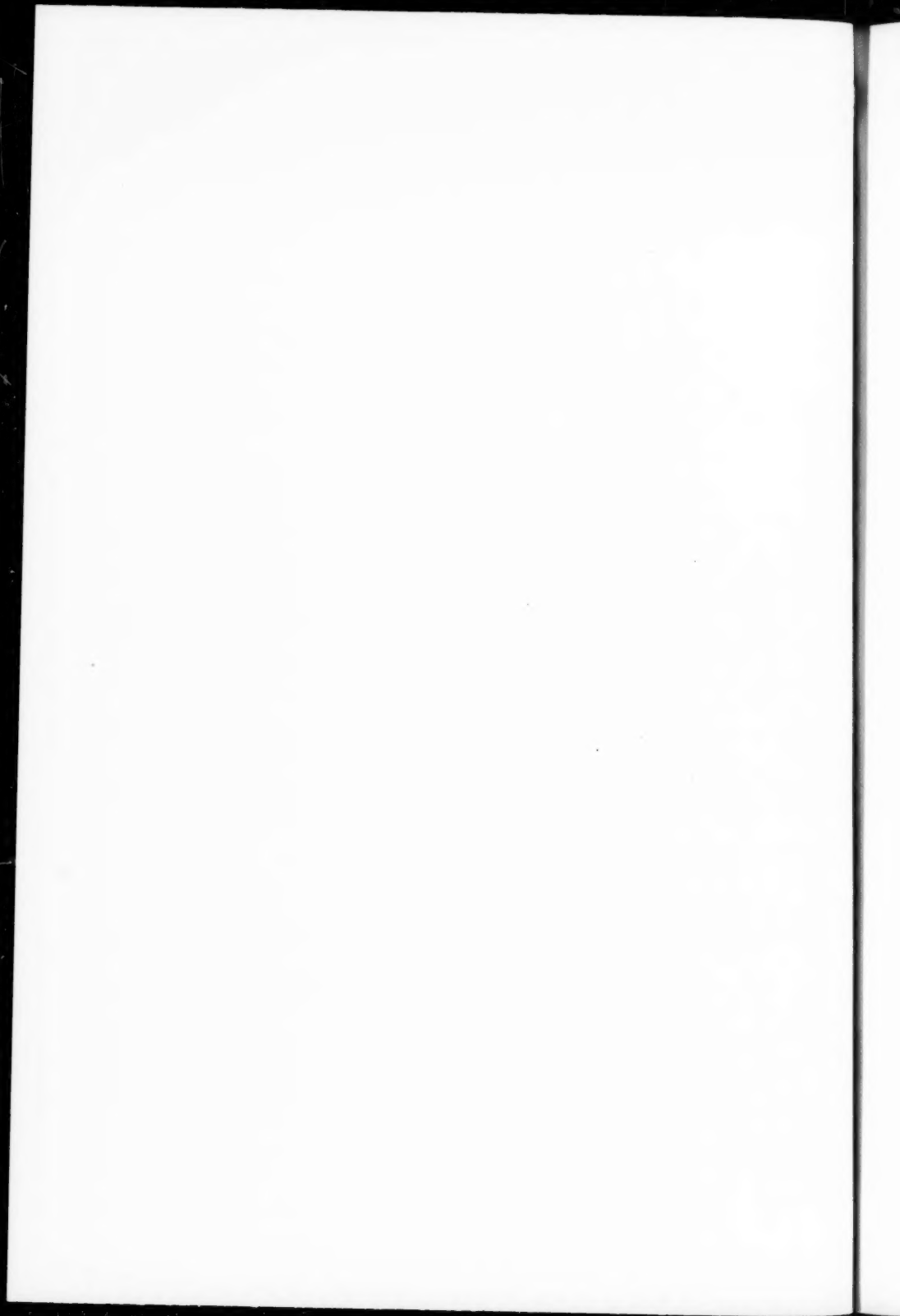


FIG. 4.

[To face Page 50.]



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MEETINGS OF SOCIETIES

JOINT TUBERCULOSIS COUNCIL

At the last meeting of the Joint Tuberculosis Council the Chairman welcomed Dr. George Fletcher, representing the North-Western Tuberculosis Society.

It was reported that a deputation had met Sir Arthur Rucker, Sir Wilson Jameson and others to discuss new arrangements to replace those contained in Memorandum 266/T. Ministry of Health Circular 114/46 was also discussed. Sir Arthur Rucker said that the Government fully accepted the argument that the tuberculous family had special needs. The same case, however, could not be made out for non-pulmonary cases as for pulmonary cases. Local health authorities would be obliged under the new Act to undertake care work, and they would be able to give some forms of assistance in kind. Sir Wilson Jameson said that consideration would be given to the deputation's request that 266/T allowances should be improved pending the introduction of new proposals. (N.B.—A full report of this interview will shortly be circulated to the medical press by Dr. C. K. Cullen, leader of the deputation.)

The Council adopted a report dealing with the National Health Services Act and ordered it to be forwarded to the Minister of Health's Standing Advisory Committee on Tuberculosis. The report is not being issued as a Council publication at present, as it may be amended at a later stage. Generally, it may be said to emphasise the Council's view that tuberculosis is a disease requiring a special organisation, and it puts forward proposals for meeting this requirement within the framework of the Act. Further details will be available later.

The Committee on Nutrition reported that they had considered the question of the effect of bread rationing on tuberculous persons in and out of hospitals and sanatoria, and they had also considered whether the time was opportune for a fresh investigation of dietaries for the tuberculous. They had, however, come to the conclusion that no action was required at present on either subject.

A circular was recently sent out by the Council to its members asking for information about the disposal of old records of tuberculous patients. Thirteen replies had been received. It appeared that seven authorities retained the records of dead patients indefinitely. The others destroyed them after periods varying from two to twenty years. Only five areas said they transferred the original documents when patients were moved to other areas.

The Council decided to invite Dr. B. R. Clarke, of the Northern Ireland Tuberculosis Authority, to fill a vacancy among the co-opted members of the Council caused by the resignation of Dr. J. B. McDougall. He has since

joined the Council, and at the last J.T.C. meeting he was welcomed by Dr. D. P. Sutherland, the chairman.

There has been some activity in recent months directed towards the creation of a statistical bureau for tuberculosis. The idea was approved by the Tuberculosis Association, who suggested that the J.T.C. might take the preliminary steps. Discussions with Nuffield Trust representatives regarding a full-scale bureau have been inconclusive up to now; meanwhile, the J.T.C. are considering to what extent statistical research on tuberculosis can be carried out without full-time staff.

The Council received a report on three years' work by the Joint Education Committee and expressed cordial appreciation of the varied educational facilities provided as a result of the Joint Committee's work, especially in the field of post-graduate refresher courses and the Tuberculosis Educational Institute.

The question of the liability of hospital and sanatorium nurses and domestics to contract tuberculosis continues to occupy much of the attention of the J.T.C.'s Nursing Committee. For some time they have been trying to initiate a statistical enquiry into this matter, but they have been advised that it would be necessary to study 1,000 new entrants for 10 years (or 2,000 annually for 5 years) in order to get reliable data. The J.T.C. have reluctantly concluded that an enquiry on this scale is out of the question, at any rate for the present. The Committee will neglect no opportunity of collecting useful information on this important subject.

The Council sent a strong protest to the Minister of Health about his announcement in Parliament that he had told the General Nursing Council of his readiness to approve rules introducing State registration for tuberculosis nurses. The ground of the Council's protest is, of course, that the Minister had already promised not to act in this matter without prior consultation with the Council. The J.T.C. hold very strongly that State registration of tuberculosis nurses should not be conditional on previous membership of the General Nursing Register, and they are naturally anxious to represent this to the Minister before any rules are irrevocably made.

The Officers of the Council were re-elected for a further year.

REVIEWS OF BOOKS

The Diagnosis and Treatment of Pulmonary Tuberculosis. By MOSES J. STONE and PAUL DUFALT. Pp. 325, Illus. 93. Henry Kimpton, London. Price 17s. 6d.

This is a new edition of Hawes and Stone's manual, entirely rewritten and brought up to date by Dr. Dufault. It is a compact volume, well printed and easy to the eye. For a book not intended as a major text it packs a remarkable amount of information and wisdom into its small pages. Clarity and brevity are the keynotes and these are admirably fulfilled. Controversial theories are avoided, but the important essentials are here plain to see.

The chapters dealing with collapse therapy are noteworthy. They provide a clear and well-balanced approach and well repay attention.

Altogether this is a sound and well-balanced book and can be safely recommended to both student and physician.

J. H. D.

Principles in Roentgen Study of the Chest. By WILLIAM SNOW. Pp. 414. Charles C. Thomas, Springfield, Illinois. Price \$10.00.

We look forward to a comprehensive radiological study of chest diseases, but this is disappointing. The construction is oddly ill-balanced. Fifty-seven pages are devoted to lobar pneumonia and bronchopneumonia, profusely illustrated. Bronchiectasis is dismissed in less than a page of print, with one ill-conceived bronchogram. Even acute bronchitis fares better.

There is a short chapter on the normal chest film, but no illustration is included. The technique of bronchography is unmentioned and the value of tomography unrecorded.

The text contains many digressions on physiology, pathology and treatment. While many of the views expressed are interesting and stimulating, some are, to say the least, controversial, such as the statement on p. 158 referring to tuberculous cavities: "It is probable that cavities usually start from bullæ." Much of this could well have been discarded. An account of bronchial and segmental anatomy would have been of more practical value. This is entirely neglected.

The volume is profusely illustrated, but the quality of the reproductions is generally poor, so that all too often details pointed out by the author in the text are invisible to us.

There is a large bibliography, but it is confined almost entirely to the American literature.

J. H. D.

Doctors Differ. By HARLEY WILLIAMS. Jonathan Cape, London. Price 12s. 6d.

Although Dr. Williams has chosen so topical a title for his new book this is no political treatise, but a series of short biographies of five very different doctors. In each study there is a secondary figure of only slightly less importance, differing from or complementary to the main personality, so that in effect the outlines of ten significant lives are sketched.

The most successful section of this book deals with John Elliotson, his researches into the powers of Mesmerism, and his unsuccessful attempts to gain acceptance for the use of hypnotic methods in medicine. This story is told with zest and enthusiasm, and enlists one's sympathy for that tactless and unfortunate pioneer.

Other sections describe the lives and activities of Hugh Owen Thomas, James Mackenzie and William Macewen, with Robert Jones, William Osler and Victor Horsley as their secondary characters. These are well-chosen pairs, for in nearly every case one is a far more attractive figure than the other, and the comparison of these forceful personalities points strongly the varying nature of greatness.

The final section concerns Robert Philip and Trudeau in the fight against tuberculosis, and covers briefly the evolution of sanatorium and dispensary treatment. Here some strange physiology calls for comment, for it is hardly logical in a disease whose primary treatment is rest to praise the open-air life because "breathing the spacious atmosphere of pure air aerates the lungs more deeply." Nor is it accurate to say that more red blood cells are formed as a result of the better absorption of oxygen from the lungs.

Dr. Williams writes fluently, but indulges in some annoying mannerisms, among them a tendency to drop into the present tense, to bestrew his pages with inverted commas, and to start a chapter with the word "he." Nevertheless

this is an entertaining book for lay or medical readers, and the former, for whom it is primarily intended, will find it informative without being over-technical.

J. V. S.

Pneumoperitoneum Treatment. By A. L. BANYAI. Mosby (U.S.A.) and Kimpton (London). 1946. Price 33s.

Dr. Banyai has been using pneumoperitoneum in the treatment of pulmonary tuberculosis since 1931. This book, which includes an historical review and a very extensive list of references, is an exhaustive account of the principles involved in, and the applications of, artificial pneumoperitoneum treatment. The opinions of a great number of other workers are quoted, and this, since little attempt is made to appraise the value of their work, obscures in some sections the author's own views.

The conditions in which treatment by artificial pneumoperitoneum is discussed include, besides pulmonary tuberculosis, tuberculous peritonitis and enteritis, tuberculous empyema, pulmonary abscess, emphysema and bronchial asthma. It is impossible to recommend this book as a guide for those inexperienced in chest disease, but as a mine of information it will be of value to the critical.

H. N.

NAPT COLONIAL SCHOLARSHIPS, 1947

1. The award of two Scholarships in 1946 proved so satisfactory that the NAPT has decided to offer six Scholarships this year. These will be open to doctors and other medical personnel throughout the British Colonial Empire. The successful holders will come to Britain for a period of six months or longer to study tuberculosis in its widest aspects, clinical, administrative and social.

2. The award will be divided as follows:

- (a) Two Scholarships (value £120 each) to registered doctors in the Colonial Medical Service.
- (b) Two Scholarships (value £100 each) to medical graduates of native Medical Schools in the British Colonies.
- (c) Two Scholarships (value £80 each) to Matrons, Nurses, Health Visitors, or other members of Colonial Sanitary Departments.

3. The successful candidates will be eligible for lodgings and training allowances from Colonial Government funds, and the details of their training during the tenure of the Scholarship will be supervised by the NAPT. Travelling expenses, purchase of books and other incidental expenditure will fall to be met by scholars out of their Scholarship moneys.

4. Applications should be made through the Colonial Medical Departments, who will forward them to the Colonial Office, which will make recommendations to the Council of the NAPT.

5. The NAPT believes that these awards will further health education in its broadest sense, and encourage the formation of anti-tuberculosis services throughout the different Colonial territories.

6. The Scholarships will be held by young men or women who wish to specialize in tuberculosis work, either fully or part-time, and who will then carry the knowledge they have gained into the various Colonial territories where they will serve.

7. An announcement of the method of sending in applications will be made shortly by the Colonial Office.

May, 1947